Navy SSBN(X) Ballistic Missile Submarine Program: Background and Issues for Congress

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Summary

The Navy's ballistic missile submarines (SSBNs) form one leg of the U.S. strategic nuclear deterrent force, or "triad," which also includes land-based intercontinental ballistic missiles (ICBMs) and land-based long-range bombers. The Navy currently operates 14 Ohio (SSBN-726) class SSBNs, also known as Trident SSBNs, the first of which is projected to reach the end of its service life in 2027.

The Navy is conducting development and design work on a planned class of 12 next-generation ballistic missile submarines, or SSBN(X)s, which the service wants to procure as replacements for the 14 Ohio-class boats. The SSBN(X) program is also known as the Ohio-class replacement program (ORP). The Navy's proposed FY2012 budget requests $1,067 million in research and development funding for the program. Navy plans call for procuring the first SSBN(X) in FY2019, with advance procurement funding for the boat beginning in FY2015.

The Navy in February 2010 preliminarily estimated the procurement cost of each SSBN(X) at $6 billion to $7 billion in FY2010 dollars. The Navy is now working to reduce the average procurement cost of boats 2-12 in the program to a target figure of $4.9 billion each in FY2010 dollars. Even with this cost-reduction effort, some observers are concerned that procuring 12 SSBN(X)s during the 15-year period FY2019-FY2033, as called for in Navy plans, could lead to reductions in procurement rates for other types of Navy ships during those years.

Potential oversight issues for Congress for the SSBN(X) program include the following:

- the potential impact of a year-long continuing resolution (CR) for FY2011 at FY2010 funding levels on the Navy's schedule for developing and procuring the SSBN(X);
- the likelihood that the Navy will be able to reduce the average procurement cost of boats 2-12 in the program to the target figure of $4.9 billion each in FY2010 dollars;
- the accuracy of the Navy's estimate of the procurement cost of each SSBN(X);
- the prospective affordability of the SSBN(X) program and its potential impact on other Navy shipbuilding programs; and
- the question of which shipyard or shipyards will build SSBN(X)s.

Options for reducing the cost of the SSBN(X) program or its potential impact on other Navy shipbuilding programs include procuring fewer than 12 SSBN(X)s; reducing the number of submarine-launched ballistic missiles (SLBMs) to be carried by each SSBN(X); stretching out the schedule for procuring SSBN(X)s and making greater use of split funding (i.e., two-year incremental funding) in procuring them; and funding the procurement of SSBN(X)s in a part of the Department of Defense (DOD) budget that is outside the Navy's budget.

This report focuses on the SSBN(X) as a Navy shipbuilding program. CRS Report RL33640, *U.S. Strategic Nuclear Forces: Background, Developments, and Issues*, by Amy F. Woolf, discusses the SSBN(X) as an element of future U.S. strategic nuclear forces in the context of strategic nuclear arms control agreements.

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Introduction

This report provides background information and potential oversight issues for Congress on the Navy's SSBN(X) program, a program to develop and procure 12 new ballistic missile submarines (SSBNs) as replacements for the Navy's current force of 14 Ohio-class SSBNs. The SSBN(X) program is also known as the Ohio-class replacement program (ORP). The Navy's proposed FY2012 budget requests $1,067 million in research and development funding for the SSBN(X) program. Decisions that Congress makes on the SSBN(X) program could substantially affect U.S. military capabilities and funding requirements, and the U.S. shipbuilding industrial base.

This report focuses on the SSBN(X) as a Navy shipbuilding program. Another CRS report discusses the SSBN(X) as an element of future U.S. strategic nuclear forces in the context of strategic nuclear arms control agreements.[1]

Background

U.S. Navy SSBNs in General

Mission of SSBNs

The U.S. Navy operates three kinds of submarines—nuclear-powered attack submarines (SSNs), nuclear-powered cruise missile submarines (SSGNs), and nuclear-powered ballistic missile submarines (SSBNs).[2] The SSNs and SSGNs are multi-mission ships that perform a variety of peacetime and wartime missions.[3] They do not carry nuclear weapons.[4]

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[1] CRS Report RL33640, *U.S. Strategic Nuclear Forces: Background, Developments, and Issues*, by Amy F. Woolf.

[2] In the designations SSN, SSGN, SSBN, and SSBN(X), the SS stands for submarine, N stands for nuclear-powered (meaning the ship is powered by a nuclear reactor), G stands for guided missile (such as a cruise missile), B stands for ballistic missile, and (X) means the design of the ship has not yet been determined.

As shown by the "Ns" in SSN, SSGN, and SSBN, all U.S. Navy submarines are nuclear-powered. Other navies operate non-nuclear powered submarines, which are powered by energy sources such as diesel engines. A submarine's use of nuclear or non-nuclear power as its energy source is not an indication of whether it is armed with nuclear weapons—a nuclear-powered submarine can lack nuclear weapons, and a non-nuclear-powered submarine can be armed with nuclear weapons.

[3] These missions include covert intelligence, surveillance, and reconnaissance (ISR), much of it done for national-level (as opposed to purely Navy) purposes; covert insertion and recovery of special operations forces (SOF); covert strikes against land targets with the Tomahawk cruise missiles; covert offensive and defensive mine warfare; anti-submarine warfare (ASW); and anti-surface ship warfare. The Navy's four SSGNs, which are converted former SSBNs, can carry larger numbers of Tomahawks and SOF personnel than can the SSNs. SSGN operations consequently may focus more strongly on Tomahawk and SOF missions than do SSN operations. For more on the Navy's SSNs and SSGNs, see CRS Report RL32418, *Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report RS21007, *Navy Trident Submarine Conversion (SSGN) Program: Background and Issues for Congress*, by Ronald O'Rourke.

[4] The Navy's non-strategic nuclear weapons—meaning all of the service's nuclear weapons other than submarine-launched ballistic missiles (SLBMs)—were removed from Navy surface ships and submarines under a unilateral U.S. nuclear initiative announced by President George H. W. Bush in September 1991. The initiative reserved a right to rearm SSNs at some point in the future with nuclear-armed Tomahawk land attack missiles (TLAM-Ns) should conditions warrant. Navy TLAM-Ns were placed in storage to support this option. DOD's report on the 2010 Nuclear Posture Review (NPR), released on April 6, 2010, states that the Untied States will retire the TLAM-Ns. (Department (continued...)

The SSBNs, in contrast, perform a specialized mission of strategic nuclear deterrence. To perform this mission, SSBNs are armed with submarine-launched ballistic missiles (SLBMs), which are large, long-range missiles armed with multiple nuclear warheads. SSBNs launch their SLBMs from large-diameter vertical launch tubes located in the middle section of the boat.[5] The SSBNs' basic mission is to remain hidden at sea with their SLBMs, so as to deter a nuclear attack on the United States by another country by demonstrating to other countries that the United States has an assured second-strike capability, meaning a survivable system for carrying out a retaliatory nuclear attack.

Navy SSBNs, which are sometimes referred to informally as "boomers,"[6] form one leg of the U.S. strategic nuclear deterrent force, or "triad," which also includes land-based intercontinental ballistic missiles (ICBMs) and land-based long-range bombers. At any given moment, some of the Navy's SSBNs are conducting nuclear deterrent patrols. The Navy's report on its FY2011 30-year shipbuilding plan states: "These ships are the most survivable leg of the Nation's strategic arsenal and provide the Nation's only day-to-day assured nuclear response capability."[7] DOD's report on the 2010 Nuclear Posture Review (NPR), released on April 6, 2010, states that "strategic nuclear submarines (SSBNs) and the SLBMs they carry represent the most survivable leg of the U.S. nuclear Triad."[8]

Current Ohio-Class SSBNs

The Navy currently operates 14 Ohio (SSBN-726) class SSBNs. The boats are commonly called Trident SSBNs or simply Tridents because they carry Trident SLBMs.

A total of 18 Ohio-class SSBNs were procured in FY1974-FY1991. The ships entered service in 1981-1997. The boats were designed and built by General Dynamics' Electric Boat Division (GD/EB) of Groton, CT, and Quonset Point, RI. They were originally designed for 30-year service lives but were later certified for 42-year service lives, consisting of two 20-year periods of operation separated by a two-year mid-life nuclear refueling overhaul, called an engineered refueling overhaul (ERO). The nuclear refueling overhaul includes both a nuclear refueling and overhaul work on the ship that is not related to the nuclear refueling.

Ohio-class SSBNs each carry 24 SLBMs. The first eight boats in the class were originally armed with Trident I C-4 SLBMs; the final 10 were armed with larger and more-capable Trident II D-5 SLBMs. The Clinton Administration's 1994 Nuclear Posture Review (NPR) recommended a

(...continued)

of Defense, *Nuclear Posture Review Report*, April 2010, pp. xiii and 28.)

[5] SSBNs, like other Navy submarines, are also equipped with horizontal torpedo tubes in the bow for firing torpedoes or other torpedo-sized weapons.

[6] This informal name is a reference to the large boom that would be made by the detonation of an SLBM nuclear warhead.

[7] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 15.

[8] Department of Defense, *Nuclear Posture Review Report*, April 2010, p. 22. The next sentence in the report states: "Today, there appears to be no viable near or mid-term threats to the survivability of U.S. SSBNs, but such threats—or other technical problems—cannot be ruled out over the long term." The report similarly states on page 23: "Today, there appears to be no credible near or mid-term threats to the survivability of U.S. SSBNs. However, given the stakes involved, the Department of Defense will continue a robust SSBN Security Program that aims to anticipate potential threats and develop appropriate countermeasures to protect current and future SSBNs."

strategic nuclear force for the START II strategic nuclear arms reduction treaty that included 14 Ohio-class SSBNs, all armed with D-5s. This recommendation prompted interest in the idea of converting the first four Ohio-class boats (SSBNs 726-729) into SSGNs, so as to make good use of the 20 years of potential operational life remaining in these four boats, and to bolster the U.S. SSN fleet. The first four Ohio-class boats were converted into SSGNs in 2002-2008,[9] and the next four (SSBNs 730-733) were backfitted with D-5 SLBMs in 2000-2005, producing the current force of 14 Ohio-class SSBNs, all of which are armed with D-5 SLBMs.

Eight of the 14 Ohio-class SSBNs are homeported at Bangor, WA, in Puget Sound; the other six are homeported at Kings Bay, GA, close to the Florida border.

Unlike most Navy ships, which are operated by single crews, Navy SSBNs are operated by alternating crews (called the Blue and Gold crews) so as to maximize the percentage of time that they spend at sea in deployed status. The Navy consequently maintains 28 crews to operate its 14 Ohio-class SSBNs.

The first of the 14 Ohio-class SSBNs (SSBN-730) will reach the end of its 42-year service life in 2027. The remaining 13 will reach the ends of their service lives at a rate of roughly one ship per year thereafter, with the 14th reaching the end of its service life in 2040.

The Navy has initiated a program to refurbish and extend the service lives of D-5 SLBMs to 2042 "to match the OHIO Class submarine service life."[10]

Figure 1 shows an Ohio-class SSBN with the hatches to some of its SLBM launch tubes open.

[9] For more on the SSGN conversion program, see CRS Report RS21007, *Navy Trident Submarine Conversion (SSGN) Program: Background and Issues for Congress*, by Ronald O'Rourke.

[10] Statement of Rear Admiral Stephen Johnson, USN, Director, Strategic Systems Programs, Before the Subcommittee on Strategic Forces of the Senate Armed Services Committee [on] FY2011 Strategic Systems, March 17, 2010, p. 4.

Figure 1. Ohio (SSBN-726) Class SSBN

With the hatches to some of its SLBM launch tubes open

Source: U.S. Navy file photo accessed by CRS on February 24, 2011, at http://www.navy.mil/management/photodb/photos/101029-N-1325N-005.jpg.

Summary of U.S. SSBN Designs

The Navy has operated four classes of SSBNs since 1959. **Table 1** compares the current Ohio-class SSBN design to the three earlier U.S. SSBN designs. As shown in the table, the size of U.S. SSBNs has grown over time, reflecting in part a growth in the size and number of SLBMs carried on each boat. The Ohio class carries an SLBM (the D-5) that is much larger than the SLBMs carried by earlier U.S. SSBNs, and it carries 24 SLBMs, compared to the 16 on earlier U.S. SSBNs.[11] In part for these reasons, the Ohio-class design, with a submerged displacement of 18,750 tons, is more than twice the size of earlier U.S. SSBNs.

[11] The larger size of the Ohio-class design also reflects a growth in size over time in U.S. submarine designs due to other reasons, such as providing increased interior volume for measures to quiet the submarine acoustically, so as to make it harder to detect.

Table 1. U.S. SSBN Classes

	George Washington (SSBN-598) class	Ethan Allen (SSBN-608) class	Lafayette/Benjamin Franklin (SSBN-616/640) class	Ohio (SSBN-726) class
Number in class	5	5	31	18/14
Fiscal years procured	FY1958-FY1959	FY1959 and FY1961	FY1961-FY1964	FY1974/FY1977 - FY1991
Years in commission	1959-1985	1961-1992	1963-2002	1981/1984 - present
Length	381.7 feet	410.5 feet	425 feet	560 feet
Beam	33 feet	33 feet	33 feet	42 feet
Submerged displacement	6,700 tons	7,900 tons	8,250 tons	18,750 tons
Number of SLBMs	16	16	16	24
Final type(s) of SLBM carried	Polaris A-3	Polaris A-3	Poseidon C-3/ Trident I C-4	Trident II D-5
Diameter of those SLBMs	54 inches	54 inches	74 inches	83 inches
Length of those SLBMs	32.3 feet	32.3 feet	34 feet	44 feet
Weight of each SLBM (pounds)	36,000 pounds	36,000 pounds	65,000/73,000 pounds	~130,000 pounds
Range of SLBMs	~2,500 nm	~2,500 nm	~2,500 nm/~4,000 nm	~4,000 nm

Sources: Prepared by CRS based on data in Norman Polmar, *The Ships and Aircraft of the U.S. Fleet*, Annapolis, Naval Institute Press, various editions, and (for SSBN decommissioning dates) U.S. Naval Vessel Register.

Notes: Beam is the maximum width of a ship. For the submarines here, which have cylindrical hulls, beam is the diameter of the hull.

The range of an SLBM can vary, depending on the number and weight of nuclear warheads it carries; actual ranges can be lesser or greater than those shown.

The George Washington-class boats were procured as modifications of SSNs that were already under construction. Three of the boats were converted into SSNs toward the ends of their lives and were decommissioned in 1983-1985. The two boats that remained SSBNs throughout their lives were decommissioned in 1981.

All five Ethan Allen-class boats were converted into SSNs toward the ends of their lives. The boats were decommissioned in 1983 (two boats), 1985, 1991, and 1992.

Two of the Lafayette/Benjamin Franklin-class boats were converted into SSNs toward the ends of their lives and were decommissioned in 1999 and 2002. The 29 that remained SSBNs throughout their lives were decommissioned in 1986-1995. For 19 of the boats, the Poseidon C-3 was the final type of SLBM carried; for the other 12, the Trident I C-4 SLBM was the final type of SLBM carried.

A total of 18 Ohio-class SSBNs were built. The first four, which entered service in 1981-1984, were converted into SSGNs in 2002-2008. The remaining 14 boats entered service in 1984-1997.

U.S.-UK Cooperation on SLBMs

SSBNs are also operated by the United Kingdom, France, Russia, and China.[12] The UK's four Vanguard-class SSBNs, which entered service in 1993-1999, each carry 16 Trident II D-5 SLBMs. Previous classes of UK SSBNs similarly carried earlier-generation U.S. SLBMs.[13] The UK's use of U.S.-made SLBMs on its SSBNs is one element of a long-standing close cooperation between the two countries on nuclear-related issues that is carried out under the 1958 Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defense Purposes (also known as the Mutual Defense Agreement). Within the framework established by the 1958 agreement, cooperation on SLBMs in particular is carried out under the 1963 Polaris Sales Agreement and a 1982 Exchange of Letters between the two governments.[14] The Navy testified in March 2010 that

[12] India in July 2009 launched a nuclear-powered submarine that is equipped to carry several short-range SLBMs; the ship is not expected to enter service until 2011 at the earliest.

[13] Although the SLBMs on UK SSBNs are U.S.-made, the nuclear warheads on the missiles are of UK design and manufacture.

[14] A March 18, 2010, report by the UK Parliament's House of Commons Foreign Affairs Committee stated:

> During the Cold War, the UK's nuclear co-operation with the United States was considered to be at the heart of the [UK-U.S.] 'special relationship'. This included the 1958 Mutual Defence Agreement, the 1963 Polaris Sales Agreement (PSA) (subsequently amended for Trident), and the UK's use of the US nuclear test site in Nevada from 1962 to 1992. The co-operation also encompassed agreements for the United States to use bases in Britain, with the right to store nuclear weapons, and agreements for two bases in Yorkshire (Fylingdales and Menwith Hill) to be upgraded to support US missile defence plans.
>
> In 1958, the UK and US signed the Mutual Defence Agreement (MDA). Although some of the appendices, amendments and Memoranda of Understanding remain classified, it is known that the agreement provides for extensive co-operation on nuclear warhead and reactor technologies, in particular the exchange of classified information concerning nuclear weapons to improve design, development and fabrication capability. The agreement also provides for the transfer of nuclear warhead-related materials. The agreement was renewed in 2004 for another ten years.
>
> The other major UK-US agreement in this field is the 1963 Polaris Sales Agreement (PSA) which allows the UK to acquire, support and operate the US Trident missile system. Originally signed to allow the UK to acquire the Polaris Submarine Launched Ballistic Missile (SLBM) system in the 1960s, it was amended in 1980 to facilitate purchase of the Trident I (C4) missile and again in 1982 to authorise purchase of the more advanced Trident II (D5) in place of the C4. In return, the UK agreed to formally assign its nuclear forces to the defence of NATO, except in an extreme national emergency, under the terms of the 1962 Nassau Agreement reached between President John F. Kennedy and Prime Minister Harold Macmillan to facilitate negotiation of the PSA.
>
> Current nuclear co-operation takes the form of leasing arrangements of around 60 Trident II D5 missiles from the US for the UK's independent deterrent, and long-standing collaboration on the design of the W76 nuclear warhead carried on UK missiles. In 2006 it was revealed that the US and the UK had been working jointly on a new 'Reliable Replacement Warhead' (RRW) that would modernise existing W76-style designs. In 2009 it emerged that simulation testing at Aldermaston on dual axis hydrodynamics experiments had provided the US with scientific data it did not otherwise possess on this RRW programme.
>
> The level of co-operation between the two countries on highly sensitive military technology is, according to the written submission from Ian Kearns, "well above the norm, even for a close alliance relationship". He quoted Admiral William Crowe, the former US Ambassador to London, who likened the UK-US nuclear relationship to that of an iceberg, "with a small tip of it sticking out, but beneath the water there is quite a bit of everyday business that goes on between our two governments in a fashion that's unprecedented in the world." Dr Kearns also commented that the personal bonds between the US/UK scientific and technical establishments were deeply rooted.
>
> (House of Commons, Foreign Affairs Committee, *Sixth Repor Global Security: UK-US Relations*, March 18, 2010, paragraphs 131-135; http://www.publications.parliament.uk/pa/cm200910/cmselect/cmfaff/114/11402.htm; paragraphs 131-135 are included in the section of the report

(continued...)

"the United States and the United Kingdom have maintained a shared commitment to nuclear deterrence through the Polaris Sales Agreement since April 1963. The U.S. will continue to maintain its strong strategic relationship with the UK for our respective follow-on platforms, based upon the Polaris Sales Agreement."[15]

The first Vanguard-class SSBN was originally projected to reach the end of its service life in 2024, but an October 2010 UK defense and security review report states that the lives of the Vanguard class ships will now be extended by a few years, so that the four boats will remain in service into the late 2020s and early 2030s.[16]

The UK plans to replace the four Vanguard-class boats with three or four next-generation SSBNs. The October 2010 UK defense and security review report states that each new SSBN is to be equipped with 8 D-5 SLBMs, rather than 12 as previously planned. The report states that "'Initial Gate'—a decision to move ahead with early stages of the work involved—will be approved and the next phase of the project will start by the end of [2010]. 'Main Gate'—the decision to start building the submarines—is required around 2016."[17] The first new boat is to be delivered by 2028, or about four years later than previously planned.[18]

The UK has wanted their replacement SSBNs to carry D-5 SLBMs, and for any successor to the D-5 SLBM to be compatible with, or be capable of being made compatible with, the D-5 launch system. President George W. Bush, in a December 2006 letter to UK Prime Minister Tony Blair, invited the UK to participate in any program to replace the D-5 SLBMs, and stated that any successor to the D-5 system should be compatible with, or be capable of being made compatible with, the launch system for the D-5 SLBM.

SSBN(X) Program

Program Origin and Milestones

Although the eventual need to replace the Ohio-class SSBNs has been known for many years, the SSBN(X) program can be traced more specifically to an exchange of letters in December 2006 between President George W. Bush and UK Prime Minister Tony Blair concerning the UK's desire to participate in a program to extend the service life of the Trident II D-5 SLBM into the 2040s, and to have its next-generation SSBNs carry D-5s. Following this exchange of letters, and with an awareness of the projected retirement dates of the Ohio-class SSBNs and the time that would likely be needed to develop and field a replacement for them, DOD in 2007 began studies

(...continued)

available at http://www.publications.parliament.uk/pa/cm200910/cmselect/cmfaff/114/11406.htm.)

[15] Statement of Rear Admiral Stephen Johnson, USN, Director, Strategic Systems Programs, Before the Subcommittee on Strategic Forces of the Senate Armed Services Committee [on] FY2011 Strategic Systems, March 17, 2010, p. 6.

[16] *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, p. 39.

[17] *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, p. 5, 38-39. For more on the UK's Successor SSBN program as it existed prior to the October 2010 UK defense and security review report, see Richard Scott, "Deterrence At A Discount?" *Jane's Defence Weekly*, December 23, 2009: 26-31.

[18] *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, p. 39.

on a next-generation sea-based strategic deterrent (SBSD).[19] The studies used the term sea-based strategic deterrent (SBSD) to signal the possibility that the new system would not necessarily be a submarine.

An Initial Capabilities Document (ICD) for a new SBSD was developed in early 2008[20] and approved by DOD's Joint Requirements Oversight Committee (JROC) on June 20, 2008.[21] In July 2008, DOD issued a Concept Decision providing guidance for an analysis of alternatives (AOA) for the program; an acquisition decision memorandum from John Young, DOD's acquisition executive, stated the new system would, barring some discovery, be a submarine.[22] The Navy established an SSBN(X) program office at about this same time.[23] The AOA reportedly began in the summer or fall of 2008.[24] The AOA was completed, with final brief to the Office of the Secretary of Defense (OSD), on May 20, 2009. The final AOA report was completed in September 2009. An AOA Sufficiency Review Letter was signed by OSD's Director, Cost Assessment & Program Evaluation (CAPE) on December 8, 2009.[25]

The program's Milestone A review meeting was held on December 9, 2010. On February 3, 2011, the Navy provided the following statement to CRS concerning the outcome of the December 9 meeting:

> The OHIO Replacement Program achieved Milestone A and has been approved to enter the Technology Development Phase of the Dept. of Defense Life Cycle Management System as of Jan. 10, 2011.
>
> This milestone comes following the endorsement of the Defense Acquisition Board (DAB), chaired by Dr. Carter (USD for Acquisition, Technology, and Logistics) who has signed the program's Milestone A Acquisition Decision Memorandum (ADM).
>
> The DAB endorsed replacing the current 14 Ohio-class Ballistic Missile Submarines (SSBNs) as they reach the end of their service life with 12 Ohio Replacement Submarines, each comprising 16, 87-inch diameter missile tubes utilizing TRIDENT II D5 Life Extended missiles (initial loadout). The decision came after the program was presented to the Defense Acquisition Board (DAB) on Dec. 9, 2010.

[19] In February 2007, the commander of U.S. Strategic Command (STRATCOM) commissioned a task force to support an anticipated Underwater Launched Missile Study (ULMS). On June 8, 2007, the Secretary of the Navy initiated the ULMS. Six days later, the commander of STRATCOM directed that a Sea Based Strategic Deterrent (SBSD) capability-based assessment (CBA) be performed. In July 2007, the task force established by the commander of STRATCOM provided its recommendations regarding capabilities and characteristics for a new SBSD. (Source: Navy list of key events relating to the ULMS and SBSD provided to CRS and the Congressional Budget Office (CBO) on July 7, 2008.)

[20] On February 14, 2008, the SBSD ICD was approved for joint staffing by the Navy's Resources and Requirements Review Board (R3B). On April 29, 2008, the SBSD was approved by DOD's Functional Capabilities Board (FCB) to proceed to DOD's Joint Capabilities Board (JCB). (Source: Navy list of key events relating to the ULMS and SBSD provided to CRS and the Congressional Budget Office (CBO) on July 7, 2008.)

[21] Navy briefing to CRS and CBO on the SBSD program, July 6, 2009.

[22] Navy briefing to CRS and CBO on the SBSD program, July 6, 2009.

[23] An August 2008 press report states that the program office, called PMS-397, "was established within the last two months." (Dan Taylor, "Navy Stands Up Program Office To Manage Next-Generation SSBN," *Inside the Navy*, August 17, 2008.

[24] "Going Ballistic," *Defense Daily*, September 22, 2008, p. 1.

[25] *Department of Defense Fiscal Year (FY) 2012 Budget Estimates, Navy, Justification Book Volume 2, Research, Development, Test & Evaluation, Navy Budget Activity 4*, entry for PE0603561N, Project 3220 (pdf page 345 of 888).

> The ADM validates the program's Technology Development Strategy and allows entry into the Technology Development Phase during which warfighting requirements will be refined to meet operational and affordability goals. Design, prototyping, and technology development efforts will continue to ensure sufficient technological maturity for lead ship procurement in 2019.
>
> The first OHIO Replacement submarine will enter service in Fiscal Year 2029 as the existing OHIO submarines reach the end of their extended service life of 43 years.[26]

A November 2010 DOD report to Congress on strategic nuclear weapon systems stated that:

> Current key milestones for the SSBN replacement program include:
>
> - Research, development, test, and evaluation (RDT&E) began in FY 2010 and continues with the goal of achieving 10 percent greater design maturity prior to starting procurement than the USS VIRGINIA class had before procurement started;
> - In FY 2015, the Navy will begin the detailed design and advanced procurement of critical components;
> - In FY 2019, the Navy will begin the seven-year construction period for the new SSBN lead ship;
> - In FY 2026, the Navy will begin the three-year strategic certification period for the lead ship; and
> - In FY 2029, the lead ship will commence active strategic at-sea service.[27]

Procurement and Replacement Schedule

Table 2 shows the Navy's proposed schedule for procuring 12 SSBN(X)s, and for having SSBN(X)s replace Ohio-class SSBNs. As shown in the table, the Navy wants to procure the first SSBN(X) in FY2019 and have it enter service in FY2029. The remaining 11 would be procured between FY2022 and FY2033 and would enter service between FY2030 and FY2040. The Navy states that the schedule for procuring the 12 SSBN(X)s

> is inextricably linked to legacy [i.e., Ohio-class] SSBN retirements. The latest start for the lead SSBN(X) is FY 2019 and the replacements must start reaching the operational force by FY 2029. There is no leeway in this plan to allow a later start or any delay in the procurement plan.[28]

[26] Source: Email from Navy Office of Legislative Affairs to CRS, February 3, 2011.

[27] *November 2010 Update to the National Defense Authorization Act of FY2010 Section 1251 Report New START Treaty Framework and Nuclear Force Structure Plans*, undated but provided by DOD to CRS on November 18, 2010, p. 10.

[28] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 24. The report similarly states on page 5 that "the first boat in the class must be procured no later than FY 2019 to ensure that 12 operational ballistic missile submarines will always be available to perform the vital strategic deterrent mission."

The implication from this statement is that deferring the procurement of one or more SSBN(X)s beyond the dates shown in **Table 2** would result in an SSBN force that drops below 12 boats for some period of time.

Table 2. Navy Schedule for Procuring SSBN(X)s and Replacing Ohio-Class SSBNs

Fiscal Year	Number of SSBN(X)s procured	Cumulative number of SSBN(X)s in service	Ohio-class SSBNs in service	Combined number of Ohio-class SSBNs and SSBN(X)s in service
2019	1		14	14
2020			14	14
2021			14	14
2022	1		14	14
2023			14	14
2024	1		14	14
2025	1		14	14
2026	1		14	14
2027	1		13	13
2028	1		12	13
2029	1	1	11	12
2030	1	2	10	12
2031	1	3	9	12
2032	1	4	8	12
2033	1	5	7	12
2034		6	6	12
2035		7	5	12
2036		8	4	12
2037		9	3	12
2038		10	2	12
2039		11	1	12
2040		12		12

Source: Navy data provided by the Navy to CRS and the Congressional Budget Office on February 18, 2010, by Navy Office of Legislative Affairs.

SSBN(X) Design Features

Although the design of the SSBN(X) has not yet been fully determined, the boat's design will reflect the following:

- The SSBN(X) is to be designed for a 40-year expected service life.[29]
- Unlike the Ohio-class design, which requires a mid-life nuclear refueling, the SSBN(X) is to be equipped with a life-of-the-ship nuclear fuel core (a nuclear fuel core that is sufficient to power the ship for its entire expected service life).[30]
- The SSBN(X) is to have SLBM launch tubes that are the same size as those on the Ohio class (i.e., tubes with a diameter of 87 inches and a length sufficient to accommodate a D-5 SLBM). This will give the SSBN(X) a beam (i.e., diameter)[31] at least as great as the 42-foot beam of the Ohio-class design, and possibly a bit larger.
- Instead of 24 SLBM launch tubes, as on the Ohio-class design, the SSBN(X) is to have 16 SLBM launch tubes.
- Although the SSBN(X) is to have fewer launch tubes than the Ohio-class SSBN, it is to have a submerged displacement about the same as that of the Ohio-class design.[32]
- The Navy states that "owing to the unique demands of strategic relevance, [SSBN(X)s] must be fitted with the most up-to-date capabilities and stealth to ensure they are survivable throughout their full 40-year life span."[33]

Program Acquisition Cost

Research and Development Cost

A November 2010 DOD report to Congress on strategic nuclear weapon systems stated that research and development costs for the SSBN(X) program for the period FY2011-FY2020 are estimated by DOD at about $11.6 billion in then-year dollars.[34] This is not the total estimated research and development cost for the SSBN(X) program, as it excludes research and development costs for FY2010 and prior years (which are shown in **Table 3**), as well as research and development costs for FY2021 and subsequent years. Given the estimated cost of $11.6 billion in then-year dollars for the period FY2011-FY2020, it is conceivable that the total research

[29] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 24.

[30] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 5. The two most recent classes of SSNs—the Seawolf (SSN-21) and Virginia (SSN-774) class boats—are built with cores that are expected to be sufficient for their entire 33-year expected service lives.

[31] Beam is the maximum width of a ship. For Navy submarines, which have cylindrical hulls, beam is the diameter of the hull.

[32] A May 2010 CBO report states that "in a recent briefing to CBO and the Congressional Research Service, the Navy stated that an SSBN(X) would probably be about the same size and have roughly the same displacement as an Ohio class submarine, even though it might have only 16 or 20 missile tubes." (Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2011 Shipbuilding Plan*, May 2010, p. 16.)

[33] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 24.

[34] *November 2010 Update to the National Defense Authorization Act of FY2010 Section 1251 Report New START Treaty Framework and Nuclear Force Structure Plans*, undated but provided by DOD to CRS on November 18, 2010, p. 10.

and development cost for the program as estimated by DOD might approach $15 billion in then-year dollars.

Procurement Cost

The Navy in February 2010 preliminarily estimated the procurement cost of each SSBN(X) at $6 billion to $7 billion in FY2010 dollars.[35] Following the SSBN(X) program's December 9, 2010, Milestone A acquisition review meeting (see "Program Origin and Milestones"), DOD issued an Acquisition Decision Memorandum (ADM) that, among other things, establishes a target average unit procurement cost for boats 2-12 in the program of $4.9 billion in FY2010 dollars.[36] The Navy is working to achieve this target cost, and estimated that, as of early 2011, its cost-reduction efforts had reduced the estimated average unit procurement cost of boats 2-12 to $5.6 billion each in FY2010 dollars.[37] The Navy is examining potential further measures to bring the cost of boats 2-12 closer to the $4.9 billion target cost.[38]

D-5 Missile Refurbishment Cost

The above cost figures do not include costs for refurbishing D-5 SLBMs so as to extend their service lives to 2042.

Common Missile Compartment (CMC)

Current U.S. and UK plans call for the SSBN(X) and the UK's replacement SSBN to use a missile compartment—the middle part of the boat with the SLBM launch tubes—of the same general design.[39] As mentioned earlier (see "U.S.-UK Cooperation on SLBMs"), the UK's SSBN is to be armed with eight SLBMs, or half the number to be carried by the SSBN(X). The modular design of the CMC will accommodate this difference. Since the UK's first Vanguard-class SSBN was originally projected to reach the end of its service life in 2024—three years before the first

[35] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 20.

[36] Christopher J. Castelli, "DOD: New Nuclear Subs Will Cost $347 Billion To Acquire, Operate," *Inside the Navy*, February 21, 2011; Elaine M. Grossman, "Future U.S. Nuclear-Armed Vessel to Use Attack-Submarine Technology," *Global Security Newswire*, February 24, 2011; Jason Sherman, "Navy Working To Cut $7.7 Billion From Ohio Replacement Program," *Inside the Navy*, February 28, 2011.

[37] See, for example, Dan Taylor, "Stackley: Navy Will Constantly Seek Ways To Drive Out SSBN(X) Costs," *Inside the Navy*, March 7, 2011; and Jason Sherman, "Navy Working To Cut $7.7 Billion From Ohio Replacement Program," *Inside the Navy*, February 28, 2011.

[38] Additional information on SSBN(X) procurement costs was presented in the November 2010 DOD report to Congress on strategic nuclear weapon systems. The report stated that procurement costs for the SSBN(X) program for the period FY2011-FY2020 were estimated by DOD at that time at about $17.8 billion in then-year dollars. (*November 2010 Update to the National Defense Authorization Act of FY2010 Section 1251 Report New START Treaty Framework and Nuclear Force Structure Plans*, undated but provided by DOD to CRS on November 18, 2010, p. 10.) Given DOD's planned schedule for procuring SSBN(X)s (see **Table 2**), this figure likely includes much (but perhaps not all) of the procurement cost for the lead boat in the program, as well as a portion (in the form of advance procurement funding) of the procurement cost of the second boat in the program.

[39] Statement of Rear Admiral Stephen Johnson, USN, Director, Strategic Systems Programs, Before the Subcommittee on Strategic Forces of the Senate Armed Services Committee [on] FY2011 Strategic Systems, March 17, 2010, p. 6, which states: "The OHIO Replacement programs includes the development of a common missile compartment that will support both the OHIO Class Replacement and the successor to the UK Vanguard Class."

Ohio-class SSBN is projected to reach the end of its service life—design work on the CMC began about three years sooner than would have been required to support the SSBN(X) program alone. This is the principal reason why the FY2010 budget included a substantial amount of research and development funding for the CMC. The UK is providing some of the funding for the design of the CMC, including a large portion of the initial funding. A March 2010 GAO report stated:

> According to the Navy, in February 2008, the United States and United Kingdom began a joint effort to design a common missile compartment. This effort includes the participation of government officials from both countries, as well as industry officials from Electric Boat Corporation and BAE Systems. To date, the United Kingdom has provided a larger share of funding for this effort, totaling just over $200 million in fiscal years 2008 and 2009.[40]

A May 2010 press report stated that "the UK has, to date, funded the vast majority of [the CMC's] upfront engineering design activity and has established a significant presence in Electric Boat's Shaw's Cove CMC design office in New London, CT."[41]

Under the October 2010 UK defense and security review report (see "U.S.-UK Cooperation on SLBMs"), the UK now plans to deliver its first SSBN in 2028, or about four years later than previously planned.

Program Funding

Table 3 shows funding for the SSBN(X) program. The table shows U.S. funding only; it does not include funding provided by the UK to help pay for the design of the CMC. As can be seen in the table, the Navy's proposed FY2012 budget requests $1,067 million in research and development funding for the program.

Table 3. SSBN(X) Program Funding

(Millions of then-year dollars, rounded to nearest tenth; totals may not add due to rounding)

	FY08	FY09	FY10	FY11 (req.)	FY12 (req.)	FY13 (proj.)	FY14 (proj.)	FY15 (proj.)	FY16 (proj.)
Research and development (R&D) funding									
PE0101221N/Project 3198	0	9.7	0	0	0	0	0	0	0
PE0603561N/Project 3220	0	0	363.4	493.0	781.6	857.5	1,064.2	786.7	748.8
PE0603561N/Project 9999	4.9	3.2	4.0	0	0	0	0	0	0
PE0603570N/Project 3219	0	0	107.5	179.3	285.4	347.1	405.5	394.7	394.3
Total R&D funding	**4.9**	**12.9**	**474.9**	**672.3**	**1,067.0**	**1,204.6**	**1,469.7**	**1,181.4**	**1,143.1**
Procurement funding	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**736.0**	**795.2**
TOTAL all funding	**4.9**	**12.9**	**474.9**	**672.3**	**1,067.0**	**1,204.6**	**1,469.7**	**1,917.4**	**1,938.3**

[40] Government Accountability Office, *Defense Acquisitions[:] Assessments of Selected Weapon Programs*, GAO-10-388SP, March 2010, p. 152.

[41] Sam LaGrone and Richard Scott, "Deterrent Decisions: US and UK Wait on Next Steps for SSBN Replacements," *Jane's Navy International*, May 2010, pp. 10-11.

Source: Navy FY2012 budget submission and (for FY2015 and FY2016 procurement funding) Navy data provided to CRS on February 25, 2010, by Navy Office of Legislative Affairs.

Notes: PE means Program Element, that is, a research and development line item. A Program Element may include several projects. **PE0101221N/Project 3198** is Underwater Launch Missile System (ULMS) project within the PE for Strategic Submarine and Weapons System Support. **PE0603561N/Project 3220** is SBSD project within the PE for Advanced Submarine System Development. **PE0603561N/Project 9999** is Congressional funding additions within the PE for Advanced Submarine System Development. **PE0603570N/Project 3219** is SSBN(X) reactor plant project within the PE for Advanced Nuclear Power Systems. **Procurement funding** shown in FY2015 and FY2016 is advance procurement funding for first SSBN(X), which is scheduled to be procured in FY2019.

Issues for Congress

Potential FY2011 issues for Congress for the SSBN(X) program include the following:

- the potential impact of a year-long continuing resolution (CR) for FY2011 at FY2010 funding levels on the Navy's schedule for developing and procuring the SSBN(X);
- the likelihood that the Navy will be able to reduce the average procurement cost of boats 2-12 in the program to the target figure of $4.9 billion each in FY2010 dollars;
- the accuracy of the Navy's estimate of the procurement cost of each SSBN(X);
- the prospective affordability of the SSBN(X) program and its potential impact on other Navy shipbuilding programs; and
- the question of which shipyard or shipyards will build SSBN(X)s.

Each of these issues is discussed below.

Near-Term Issue: Potential Impact of Year-Long Continuing Resolution

One oversight issue for Congress is the potential impact of a year-long continuing resolution (CR) for FY2011 at FY2010 funding levels on the Navy's schedule for developing and procuring the SSBN(X). As shown in **Table 3**, the amount of research and development funding requested for the SSBN(X) program for FY2011 ($672.3 million) is about 40% higher than the amount provided for FY2010 ($474.9 million). If SSBN(X) research and development work in FY2011 is funded at FY2010 funding levels, it would likely require the Navy to postpone to some of the work that was scheduled for FY2011. This could make it more difficult for the Navy to complete SSBN(X) development in time to support the procurement of the lead SSBN(X) in FY2019. As discussed earlier (see "Procurement and Replacement Schedule" in "Background"), delaying the procurement of the first boat beyond FY2019 could result in an SSBN force that drops below 12 boats at some point.

Likelihood That Navy Will Reach $4.9 Billion Target Cost

Another potential oversight issue for Congress is the likelihood that the Navy will be able to achieve DOD's goal of reducing the average unit procurement cost of boats 2-12 in the program

to $4.9 billion each in FY2010 dollars. As mentioned earlier, as of early 2011, the Navy estimated that its cost-reduction efforts had reduced the average unit procurement cost of boats 2-12 to $5.6 billion each in FY2010 dollars, leaving another $700 million or so in cost reduction to reach the $4.9 billion target cost.

Measures that the Navy has taken to reduce the average unit procurement cost of boats 2-12 to about $5.6 billion include, among other things, reducing the number of SLBM launch tubes from 20 to 16, and making the launch tubes no larger in diameter than those on the Ohio-class design.[42] The Navy is examining potential further measures to bring the cost of boats 2-12 closer to the $4.9 billion target cost. Potential oversight questions include the following:

- How did DOD settle on the figure of $4.9 billion in FY2010 dollars as the target average unit procurement cost for boats 2-12 in the program? On what analysis was the selection of this figure based?
- How difficult will it be for the Navy to reach this target cost? What options is the Navy examining to achieve the additional $700 million or so in unit procurement cost savings needed to reach it?
- Would a boat costing $4.9 billion have sufficient capability to perform its intended missions?
- What, if anything, does DOD plan to do if the Navy is unable to achieve the $4.9 billion target cost figure? If $4.9 billion is the target figure, is there a corresponding "ceiling" figure higher than $4.9 billion, above which DOD would not permit the SSBN(X) program to proceed? If no such figure exists, should DOD establish one?

Accuracy of Navy's Estimated Unit Procurement Cost

Another oversight issue for Congress concerns the accuracy of the Navy's estimate of the procurement cost of each SSBN(X). The accuracy of the Navy's estimate is a key consideration in assessing the potential affordability of the SSBN(X) program, including its potential impact on the Navy's ability to procure other kinds of ships during the years of SSBN(X) procurement. Some of the Navy's ship designs in recent years, such as the San Antonio (LPD-17) class amphibious ship[43] and the Littoral Combat Ship (LCS),[44] have proven to be more expensive to build than the Navy originally estimated. The Congressional Budget Office (CBO) in recent years has issued procurement cost estimates for certain Navy ships that are higher than the Navy's estimates for those ships.

The accuracy of the Navy's estimate can be assessed in part by examining known procurement costs for other recent Navy submarines—including Virginia (SSN-774) class attack submarines (which are currently being procured), Seawolf (SSN-21) class attack submarines (which were

[42] The Navy had examined the option of equipping the SSBN(X) with tubes greater in diameter than those on the Ohio-class design, so as to support an option of arming the boats many years from now with a new SLBM that is larger in diameter than the D-5 SLBM.

[43] For more on the LPD-17 program, see CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

[44] For more on the LCS program, see CRS Report RL33741, *Navy Littoral Combat Ship (LCS) Program: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

procured prior to the Virginia class), and Ohio (SSBN-726) class ballistic missile submarines—and then adjusting these costs for the SSBN(X) program so as to account for factors such as differences in ship displacement and design features, changes over time in submarine technologies (which can either increase or reduce a ship's procurement cost, depending on the exact technologies in question), advances in design for producibility (i.e., design features that are intended to make ships easier to build), advances in shipyard production processes (such as modular construction), and changes in submarine production economies of scale (i.e., changes in the total number of attack submarines and ballistic missile submarines under construction at any one time).

The Navy's estimated unit procurement cost for the program at any given point will reflect assumptions in, among other things, which shipyard or shipyards will build the boats, and how much Virginia-class construction will be taking place in the years when SSBN(X)s are being built. Changing the Navy's assumption about which shipyard or shipyards will build SSBN(X)s could reduce or increase the Navy's estimated unit procurement cost for the boats. If shipbuilding affordability pressures result in Virginia-class boats being removed from the 30-year shipbuilding plan during the years of SSBN(X) procurement, the resulting reduction in submarine production economies of scale could make SSBN(X)s more expensive to build than the Navy estimates.

Program Affordability and Impact on Other Navy Shipbuilding Programs

Even with the Navy's current effort to reduce the estimated unit procurement cost of the SSBN(X) toward DOD's target figure, some observers are concerned that the SSBN(X) program could significantly compound a challenge the Navy faces concerning the affordability of its long-term shipbuilding program. These observers are concerned that procuring 12 SSBN(X)s during the 15-year period FY2019-FY2033, as called for in Navy plans, could lead to reductions in procurement rates for other types of Navy ships during those years.[45] The Navy's February 2010 report on its 30-year (FY2011-FY2030) shipbuilding plan states:

> Recapitalizing the SSBN force will impact the Navy in the mid-term as significant resources are allocated to the SSBN(X) recapitalization program ... these ships require significant resource commitment and they will impact the Navy's ability to procure other shipbuilding requirements during the period when they are being procured....
>
> The SSBN(X) procurements will be concurrent with wholesale end-of-service-life retirements of SSN 688 submarines, CG 47 class guided missile cruisers, DDG 51 class guided missile destroyers, and LSD 41/49 class dock landing ships. While the SSBN(X) is being procured, the Navy will be limited in its ability to procure other ship classes. This slowdown in procurement will occur when the Navy needs to be procuring at least 10 ships per year to maintain its force level against the anticipated ship retirements from the 1980s and 1990s.[46]

The report also states:

[45] See, for example, John M. Donnelly, "Cost Of Nuclear Subs Could Sink Navy Budget," *CQ Today*, March 2, 2010.

[46] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, pp. 24-25.

> Because of the high expected costs for these important national assets, yearly shipbuilding expenditures during the mid-term planning period [FY2021-FY2030] will average about $17.9B (FY2010$) [$17.9 billion in constant FY2010 dollars] per year, or about $2B more than the steady-state 30-year average. Even at this elevated funding level, however, the total number of ships built per year will inevitably fall because of the percentage of the shipbuilding account which must be allocated for the procurement of the SSBN. In the far-term planning period, average shipbuilding expenditures fall back to a more sustainable level of about $15.3B (FY2010$) average per year. Moreover, after the production run of SSBN(X)s comes to an end in FY 2033, the average number of ships built per year begins to rebound.[47]

The Navy's FY2011 30-year shipbuilding plan includes a total of 276 ships and states that the 12 SSBN(X)s are to be funded within the Navy's shipbuilding budget.[48] An earlier draft of the 30-year plan that was reported in December 2009 suggested that funding the 12 SSBN(X)s within the Navy's shipbuilding budget without an offsetting increase to the shipbuilding budget would reduce the number of ships in the 30-year plan from 278 to 222—a reduction of 56 ships. The 56 eliminated ships included 19 destroyers, 15 Littoral Combat Ships (LCSs), four SSNs, three amphibious ships, and 15 auxiliary ships.[49]

In addition to making further changes in the design of the SSBN(X), options for reducing the cost of the SSBN(X) program and the program's potential impact on the Navy's ability to procure other kinds of ships in desired numbers include the following:

- reducing the planned number of SSBN(X)s;
- altering the schedule for procuring the SSBN(X)s so as to create additional opportunities for using incremental funding for procuring the ships; and
- funding the procurement of SSBN(X)'s outside the Navy's shipbuilding budget.

Each of these options is discussed below.

Reducing the Planned Number of SSBN(X)s

Some observers over the years have advocated or presented options for an SSBN force of fewer than 12 SSBNs. The Congressional Budget Office (CBO), for example, has at times in the past presented options for reducing the SSBN force to 10 boats as a cost-reduction measure.[50] A June 2010 report by a group known as the Sustainable Defense Task Force recommends reducing the

[47] U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 5.

[48] The report states that "funding for the SSBN(X) will be included in the SCN core budget." (U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010, p. 4.) SCN stands for the Shipbuilding and Conversion, Navy appropriation account—the Navy's shipbuilding budget.

[49] See the tables of the 222- and 278-ship scenarios published in *Inside the Navy* on December 7, 2009, as well as Christopher J. Castelli, "Navy Confronts $80 Billion Cost Of New Ballistic Missile Submarines," *Inside the Pentagon*, December 3, 2009.

[50] See, for example, Congressional Budget Office, *Rethinking the Trident Force*, July 1993, 78 pp.; and Congressional Budget Office, *Budget Options*, March 2000, p. 62.

SSBN force to seven boats;[51] a September 2010 report from the Cato Institute recommends reducing the SSBN force to six boats.[52]

Views on whether a force of fewer than 12 SSBN(X)s would be adequate could depend on, among other things, assessments of strategic nuclear threats to the United States and the role of SSBNs in deterring such threats as a part of overall U.S. strategic nuclear forces, as influenced by the terms of strategic nuclear arms control agreements.[53] Reducing the number of SSBNs below 12 could also raise a question as to whether the force should continue to be homeported at both Bangor, WA, and Kings Bay, GA, or consolidated at a single location.

U.S. strategic nuclear deterrence plans require a certain number of strategic nuclear warheads to be available for use on a day-to-day basis. After taking into account warheads on the other two legs of the strategic nuclear triad, as well as the number of warheads on an SSBN's SLBMs, this translates into a requirement for a certain number of SSBNs to be on station (i.e., within range of expected targets) in Pacific and Atlantic waters at any given moment. The SSBN force is sized to support this requirement. Given the time needed for at-sea training operations, restocking SSBNs with food and other consumables, performing maintenance and repair work on the SSBNs, and transiting to and from deterrent patrol areas, only a fraction of the SSBN force can be on patrol at any given moment. The Navy's position is that the requirement for having a certain number of SSBNs on patrol at any given moment translates into a need for a force of 14 Ohio-class boats, and that this requirement can be met in the future by a force of 12 SSBN(X)s.

Altering the Schedule for Procuring SSBN(X)s to Make More Use of Incremental Funding

Another option for managing the potential impact of the SSBN(X) program on other Navy shipbuilding programs would be to stretch out the schedule for procuring SSBN(X)s and make greater use of split funding (i.e., two-year incremental funding) in procuring them.[54] This option would not reduce the total procurement cost of the SSBN(X) program—to the contrary, it might increase the program's total procurement cost somewhat by reducing production learning curve benefits in the SSBN(X) program.[55] This option could, however, reduce the impact of the SSBN(X) program on the amount of funding available for the procurement of other Navy ships in certain individual years. This might reduce the amount of disruption that the SSBN(X) program causes to other shipbuilding programs in those years, which in turn might avoid certain disruption-induced cost increases for those other programs. The annual funding requirements for the SSBN(X) program might be further spread out by funding some of the SSBN(X)s with three- or four-year incremental funding.[56]

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[51] *Debt, Deficits, and Defense, A Way Forward[:] Report of the Sustainable Defense Task Force*, June 11, 2010, pp. 19-20.

[52] Benjamin H. Friedman and Christopher Preble, Budgetary Savings from Military Restraint, Washington, Cato Institute, September 23, 2010 (Policy Analysis No. 667), pp. 8.

[53] For further discussion, see CRS Report RL33640, *U.S. Strategic Nuclear Forces: Background, Developments, and Issues*, by Amy F. Woolf.

[54] Under split funding, a boat's procurement cost is divided into two parts, or increments. The first increment would be provided in the fiscal year that the boat is procured, and the second would be provided the following fiscal year.

[55] Procuring one SSBN(X) every two years rather than at the Navy's planned rate of one per year could result in a loss of learning at the shipyard in moving from production of one SSBN to the next.

[56] The Navy, with congressional support, currently uses split funding to procure large-deck amphibious assault ships (continued...)

Table 4 shows the Navy's currently planned schedule for procuring 12 SSBN(X)s and a notional alternative schedule that would start two years earlier and end two years later than the Navy's currently planned schedule. Although the initial ship in the alternative schedule would be procured in FY2017, it would be executed as it if were funded in FY2019. Subsequent ships in the alternative schedule that are funded earlier than they would be under the Navy's currently planned schedule could also be executed as if they were funded in the year called for under the Navy's schedule. Congress in the past has funded the procurement of ships whose construction was executed as if they had been procured in later fiscal years.[57] The ability to stretch the end of the procurement schedule by two years, to FY2035, could depend on the Navy's ability to carefully husband the use of the nuclear fuel cores on the last two Ohio-class SSBNs, so as to extend the service lives of these two ships by one or two years. Alternatively, Congress could grant the Navy the authority to begin construction on the 11th boat a year before its nominal year of procurement, and the 12th boat two years prior to its nominal year of procurement.

(...continued)

(i.e., LHAs). The Navy currently is permitted by Congress to use four-year incremental funding for procuring the first three Ford (CVN-78) class carriers (i.e., CVN-78, CVN-79, and CVN-80); the authority was granted in Section 121 of the FY2007 defense authorization act [H.R. 5122/P.L. 109-364 of October 17, 2006]).

[57] Congress funded the procurement of two aircraft carriers (CVNs 72 and 73) in FY1983, and another two (CVNs 74 and 75) in FY1988. Although CVN-73 was funded in FY1983, it was built on a schedule consistent with a carrier funded in FY1985; although CVN-75 was funded in FY1988, it was built on a schedule consistent with a carrier funded in FY1990 or FY1991.

Table 4. Navy SSBN(X) Procurement Schedule and a Notional Alternative Schedule

Fiscal year	Navy's Schedule	Boat might be particularly suitable for 2-, 3-, or 4-year incremental funding	Notional alternative schedule	Boat might be particularly suitable for 2-, 3-, or 4-year incremental funding
2017			1	X
2018				
2019	1	X	1	X
2020				
2021			1	X
2022	1	X		
2023			1	X
2024	1			
2025	1		1	
2026	1		1	
2027	1		1	
2028	1		1	
2029	1		1	X
2030	1			
2031	1	X	1	X
2032	1	X		
2033	1	X	1	X
2034				
2035			1	X
Total	**12**		**12**	

Source: Navy's current plan is taken from U.S. Navy, *Report to Congress on Annual Long-Range Plan for Construction of Naval Vessels for FY 2011*, February 2010. Potential alternative plan prepared by CRS.

Notes: Notional alternative schedule could depend on Navy's ability to carefully husband the use of the nuclear fuel cores on the last two Ohio-class SSBNs, so as to extend the service lives of these two ships by one or two years. Alternatively, Congress could grant the Navy the authority to begin construction on the 11th boat a year before its nominal year of procurement, and the 12th boat two years prior to its nominal year of procurement. Under Navy's schedule, boat to be procured un FY2031 might be particularly suitable for 4-year incremental funding, and boat to be procured in FY2032 might be particularly suitable for 3- or 4-year incremental funding.

Procuring SSBN(X)s Outside Navy's Shipbuilding Budget

Some observers have suggested funding the procurement of SSBN(X)s outside the Navy's shipbuilding budget, so as to preserve Navy shipbuilding funds for other Navy shipbuilding programs. Among those who have raised this idea are Admiral Gary Roughead, the Chief of Naval Operations (CNO).[58] There would be some precedent for such an arrangement:

[58] See, for example, Jason Sherman, "Roughead Wants SSBN(X) Program Funding Outside Shipbuilding Budget," *Inside the Navy*, February 14, 2011.

- DOD sealift ships and Navy auxiliary ships are funded in the National Defense Sealift Fund (NDSF), a part of DOD's budget that is outside the Navy's budget (and also outside the procurement title of the DOD appropriations act).
- Most spending for ballistic missile defense (BMD) programs (including procurement-like activities) is funded through the Defense-Wide research and development account rather than through the research and development and procurement accounts of the individual military services.

A rationale for funding DOD sealift ships in the NDSF is that DOD sealift ships perform a transportation mission that primarily benefits services other than the Navy, and therefore should not be forced to compete for funding in a Navy budget account that funds the procurement of ships central to the Navy's own missions. A rationale for funding BMD programs together in the Defense-Wide research and development account is that this makes potential tradeoffs in spending among various BMD programs more visible and thereby helps to optimize the use of BMD funding.

As a reference tool for better understanding DOD spending, DOD includes in its annual budget submission a presentation of the DOD budget reorganized into 11 program areas, of which one is strategic forces. The FY2011 budget submission, for example, shows that the strategic forces program area received about $12.6 billion in funding in FY2010, and that about $11.1 billion is requested for the program area for FY2011.[59]

Supporters of funding the procurement of SSBN(X)s outside the Navy's shipbuilding budget might argue that this could help protect funding for other Navy shipbuilding programs. They could also argue that creating a new budget account for strategic nuclear forces of all kinds could help DOD better view potential tradeoffs in spending for various strategic nuclear forces programs and thereby help DOD better optimize the use of strategic forces funding.

Skeptics of funding the procurement of SSBN(X)s outside the Navy's shipbuilding budget could argue that it might do little to protect funding for other Navy shipbuilding programs, because if DOD were to move the SSBN(X)s out of the Navy's shipbuilding budget, DOD might also remove the funding that was there for the SSBN(X)s. They might also argue that shifting SSBN(X)s out of the Navy's shipbuilding budget would make it harder to track and maintain oversight over Navy shipbuilding activities, and that creating a new budget account for strategic nuclear forces of all kinds could endanger the SSBN(X) program by making it more visible to those who might support reduced spending on nuclear-weapon-related programs.

A March 11, 2010, press report stated: "The massive cost of replacing the Navy's nuclear ballistic missile submarines will be shouldered in the coming years by diverting funds from other naval and Pentagon programs and perhaps by boosting the defense budget, but the program should not get its own special funding stream, according to Deputy Defense Secretary William Lynn."[60]

[59] Department of Defense, *National Defense Budget Estimates For FY 2011, March 2010*, Table 6-4, "Department of Defense TOA by Program," page 79. See also Table 6-5 on page 80, which presents the same data in constant FY2011 dollars. The other 10 program areas in addition to strategic forces are general purpose forces; C3, intelligence and space; mobility forces; guard and reserve forces; research and development; central supply and management; training, medical and other; administration and associated; support of other nations; and special operations forces. (A 12th category—undistributed—shows relatively small amounts of funding.)

[60] Christopher J. Castelli, "Lynn: Navy, DOD To Shoulder SSBN(X) Cost Without Separate Fund," *Inside the Pentagon*, March 11, 2010.

Construction Shipyard(s)

Building SSBN(X)s

Another potential issue for Congress regarding the SSBN(X) program is which shipyard or shipyards would build SSBN(X)s. Two U.S. shipyards are capable of building nuclear-powered submarines—General Dynamics' Electric Boat Division of Groton, CT, and Quonset Point, RI (GD/EB), and the shipyard at Newport News, VA, that currently forms part of Northrop Grumman Shipbuilding (NGSB/NN). GD/EB's primary business is building nuclear-powered submarines; it can also perform submarine overhaul work. NGSB/NN's primary lines of business are building nuclear-powered aircraft carriers, building nuclear-powered submarines, and performing overhaul work on nuclear-powered aircraft carriers.

Table 5 shows the numbers of SSBNs built over time by GD/EB, NGSB/NN, and two government-operated naval shipyards (NSYs)—Mare Island NSY, located in the San Francisco Bay area, and Portsmouth NSY of Portsmouth, NH, and Kittery, ME. Mare Island NSY is no longer in operation. NSYs have not built new Navy ships since the early 1970s; since that time, they have focused solely on overhauling and repairing Navy ships.

As can be seen in the table, the Ohio-class boats were all built by GD/EB, and the three previous SSBN classes were built partly by GD/EB, and partly by NGSB/NN. GD/EB was the builder of the first boat in all four SSBN classes. The most recent SSBNs built by NGSB/NN were the George C. Marshall (SSBN-654) and George Washington Carver (SSBN-656), which were Lafayette/Benjamin Franklin-class boats that were procured in FY1964 and entered service in 1966.

Table 5. Construction Shipyards of U.S. SSBNs

	George Washington (SSBN-598) class	Ethan Allen (SSBN-608) class	Lafayette/ Benjamin Franklin (SSBN-616/640) class	Ohio (SSBN-726) class
Fiscal years procured	FY58-FY59	FY59 and FY61	FY61-FY64	FY77-FY91
Number built by GD/EB	2	2	13	18
Number built by NGSB/NN	1	3	10	
Number built by Mare Island NSY	1		6	
Number built by Portsmouth NSY	1		2	
Total number in class	**5**	**5**	**31**	**18**

Source: Prepared by CRS based on data in Norman Polmar, *The Ships and Aircraft of the U.S. Fleet*, Annapolis, Naval Institute Press, various editions. NSY means naval shipyard.

Notes: GD/EB was the builder of the first boat in all four SSBN classes. The George Washington-class boats were procured as modifications of SSNs that were already under construction. A total of 18 Ohio-class SSBNs were built; the first four were converted into SSGNs in 2002-2008, leaving 14 in service as SSBNs.

There are at least five basic possibilities for building SSBN(X)s:

- **build all SSBN(X)s at GD/EB**—the approach that was used for building the Ohio-class SSBNs;

- **build all SSBN(X)s at NGSB/NN**;
- **build some SSBN(X)s GD/EB and some at NGSB/NN**—the approach that was used for building the George Washington-, Ethan Allen-, and Lafayette/Benjamin Franklin-class SSBNs;
- **build each SSBN(X) jointly at GD/EB and NGSB/NN, with final assembly of the boats alternating between the yards**—the approach currently being used for building Virginia-class SSNs;[61] and
- **build each SSBN(X) jointly at GD/EB and NGSB/NN, with one yard—either GD/EB or NGSB/NN—performing final assembly on every boat**.

In assessing these five approaches, policymakers may consider a number of factors, including their potential costs, their potential impacts on employment levels at GD/EB and NGSB/NN, and the relative value of preserving SSBN-unique construction skills (such as those relating to the construction and installation of SLBM compartments) at one shipyard or two. The relative costs of these five approaches could depend on a number of factors, including the following:

- each yard's share of SSBN(X) production work (if both yards are involved);
- the number of SSNs procured during the years of SSBN(X) procurement (which can affect economies of scale in submarine production);
- whether the current joint-production arrangement for the Virginia class remains in effect during those years (if the SSNs procured are Virginia-class boats);[62] and
- the volume of non-submarine-construction work performed at the two shipyards during these years, which would include in particular aircraft carrier construction and overhaul work at NGSB/NN.

A January 12, 2011, press report stated:

[61] Under the joint-production arrangement for Virginia-class boats, GD/EB builds certain parts of each boat, NGSB/NN builds certain other parts of each boat, and the two yards take turns building the reactor compartment and performing final assembly work. GD/EB is the final assembly yard for the first Virginia-class boat, the third one, and so on, while NGSB/NN is the final assembly yard for the second boat, the fourth one, and so on. The arrangement provides a roughly 50-50 split in profits between the two firms for the production of Virginia-class SSNs. The agreement governing the joint-production arrangement cannot be changed without the consent of both firms. Virginia-class SSNs are the first U.S. nuclear-powered submarines to be built jointly by two shipyards; all previous U.S. nuclear-powered submarines were built under the more traditional approach of building an entire boat within a single yard.

The Virginia-class joint-production arrangement was proposed by the two shipyards, approved by the Navy, and then approved by Congress as part of its action on the FY1998 defense budget. A principal goal of the arrangement is to preserve submarine-construction skills at two U.S. shipyards while minimizing the cost of using two yards to build a class of submarines that is procured at a relatively low rate of one or two boats per year. Preserving submarine-construction skills at two yards is viewed as a hedge against the possibility of operations at one of the yards being disrupted by a natural or man-made disaster.

The joint-production arrangement is more expensive than single-yard strategy of building all Virginia-class boats at one shipyard (in part because the joint-production strategy splits the learning curve for reactor compartment construction and final assembly work on Virginia-class SSNs), but it is less expensive than a separate-yard strategy of building complete Virginia-class separately at both yards (in part because a separate-construction strategy splits the learning curve for all aspects of Virginia-class construction work, and because, in the absence of other submarine-construction work, a procurement rate of one or two Virginia-class boats per year is viewed as insufficient to sustain a meaningful competition between the two yards for contracts to build the boats).

[62] The agreement governing the joint-production arrangement for the Virginia class cannot be changed without the consent of both yards.

> While the [SSBN(X)] submarine-building contracts would likely be competitively bid, [Electric Boat President] Casey says he doubts any other company—even its attack-submarine-building partner Northrop Grumman—can secure the work. Electric Boat built the existing Ohio-class fleet.
>
> "We have every intention of building every one of those ships," he says. "There's no one else [who was] involved in designing and building that [Ohio-class] platform.[63] It's up to us to convince people we can do it at the right price."[64]

Building CMCs for the UK's SSBNs

A related question is whether the CMCs for the UK's replacement SSBNs should be built in the United States or the UK. Building them in the United States could reduce the procurement cost of CMCs produced for both countries' SSBNs. It could also help maintain employment levels in U.S. shipyards. The UK, however, might prefer to build its CMCs in the UK in order to help maintain employment levels in UK shipyards or to preserve certain submarine-construction skills. An agreement to build the UK's CMCs in the United States might include what is known as an "offset"—a corresponding agreement to have the UK build some portion of a defense item that is being procured for use by the U.S. military.

Legislative Activity for FY2012

As shown in **Table 3**, the Navy's proposed FY2012 budget requests $1,067 million in research and development funding for the SSBN(X) program.

[63] The bracketed words in this sentence were inserted by CRS following a February 8, 2011, telephone call to CRS from Electric Boat in which Electric Boat stated that sentence in Mr. Casey's quote refers to Electric Boat being the sole designer and builder of the current Ohio-class SSBNs.

[64] Michael Fabey, "Electric Boat Recruits Engineers For Ohio-Class Sub Replacement," *Aerospace Daily & Defense Report*, January 12, 2011: 1-2.

Appendix. Legislative Activity for FY2011

FY2011 Further Continuing Appropriations Amendments (H.J.Res. 44/P.L. 112-4)

P.L. 112-4 of March 2, 2011—the most recent FY2011 continuing resolution—generally funds government programs through March 18, 2011, at FY2010 funding levels.

Congressional Action on FY2011 Funding Request Other Than P.L. 112-4

Table A-1 summarizes other congressional action other than H.R. 3082/P.L. 111-322 on the Navy's FY2011 funding request for the SSBN(X) program.

Table A-1. Congressional Action on FY2011 Funding Request Other than H.R. 3082/P.L. 111-322

(Millions of then-year dollars, rounded to nearest tenth; totals may not add due to rounding)

		Authorization			Appropriation		
	Request	HASC	SASC	Conf.	HAC	SAC	Conf.
PE0603561N/Project 3220	493.0	493.0	493.0			Not clear – see narrative discussion below	
PE0603570N/Project 3219	179.3	179.3	179.3			179.3	
TOTAL	**672.3**	**672.3**	**672.3**			**Not clear**	

Sources: For request: Navy data provided to CRS on March 11, 2010, by Navy Office of Legislative Affairs. For congressional authorization and appropriation action: committee and conference reports.

Notes: HASC is House Armed Services Committee; **SASC** is Senate Armed Services Committee; **HAC** is House Appropriations Committee; **SAC** is Senate Appropriations Committee; **Conf.** is conference report. **PE** means Program Element, that is, a research and development line item. A Program Element may include several projects. **PE0603561N/Project 3220** is Sea Based Strategic Deterrent project within the PE for Advanced Submarine System Development. **PE0603570N/Project 3219** is SSBN(X) reactor plant project within the PE for Advanced Nuclear Power Systems.

FY2011 Defense Authorization Act (H.R. 6523/P.L. 111-383)

House (H.R. 5136)

The House Armed Services Committee, in its report (H.Rept. 111-491 of May 21, 2010) on the FY2011 defense authorization bill (H.R. 5136), recommends approval of the Navy's FY2011 research and development funding request for the SSBN(X) program (page 147, line 41, and page 148, line 45). Section 211(c) of H.R. 5136 as reported by committee would limit the obligation

and expenditure of FY2011 Navy research and development funding for the SSBN(X) until 30 days after the Navy submits a report on the SSBN(X) program. Section 211 states:

> SEC. 211. REPORT REQUIREMENTS FOR REPLACEMENT PROGRAM OF THE OHIO-CLASS BALLISTIC MISSILE SUBMARINE.
>
> (a) Findings- Congress makes the following findings:
>
> (1) The sea-based strategic deterrence provided by the ballistic missile submarine force of the Navy has been essential to the national security of the United States since the deployment of the first ballistic missile submarine, the USS George Washington SSBN 598, in 1960.
>
> (2) Since 1960, a total of 59 submarines have served the United States to provide the sea-based strategic deterrence.
>
> (3) As of the date of the enactment of this Act, the sea-based strategic deterrence is provided by the tremendous capability of the 14 ships of the Ohio-class submarine force, which have been the primary sea-based deterrent force for more than two decades.
>
> (4) Ballistic missile submarines are the most survivable asset in the arsenal of the United States in the event of a surprise nuclear attack on the country because, being submerged for months at a time, these submarines are virtually undetectable to any adversary and therefore invulnerable to attack, thus providing the submarines with the ability to respond with significant force against any adversary who attacks the United States or its allies.
>
> (b) Sense of Congress- It is the sense of Congress that—
>
> (1) as Ohio-class submarines reach the end of their service life and are retired, the United States must maintain the robust sea-based strategic deterrent force that has the ability to remain undetected by potential adversaries and must have the capability to deliver a retaliatory strike of such magnitude that no rational actor would dare attack the United States;
>
> (2) the Secretary of Defense should conduct a comprehensive analysis of the alternative capabilities to provide the sea-based strategic deterrence that includes consideration of different types and sizes of submarines, different types and sizes of missile systems, the number of submarines necessary to provide such deterrence, and the cost of each alternative; and
>
> (3) prior to requesting more than $1,000,000,000 in research and development funding to develop a replacement for the Ohio-class ballistic missile submarine force in advance of a Milestone A decision, the Secretary of Defense should have made available to Congress the guidance issued by the Director of Cost Assessment and Performance Evaluation with respect to the analysis of alternative capabilities and the results of such analysis.
>
> (c) Limitation-
>
> (1) REPORT- Of the funds authorized to be appropriated by this Act or otherwise made available for fiscal year 2011 for research and development for the Navy, not more than 50 percent may be obligated or expended to research or develop a submarine as a replacement for the Ohio-class ballistic missile submarine force unless—
>
> (A) the Secretary of Defense submits to the congressional defense committees a report including—

(i) guidance issued by the Director of Cost Assessment and Performance Evaluation with respect to the analysis of alternative capabilities to provide the sea-based strategic deterrence currently provided by the Ohio-class ballistic missile submarine force and any other guidance relating to requirements for such alternatives intended to affect the analysis;

(ii) an analysis of the alternative capabilities considered by the Secretary to continue the sea-based strategic deterrence currently provided by the Ohio-class ballistic missile submarine force, including—

(I) the cost estimates for each alternative capability;

(II) the operational challenges and benefits associated with each alternative capability; and

(III) the time needed to develop and deploy each alternative capability; and

(iii) detailed reasoning associated with the decision to replace the capability of sea-based deterrence provided by the Ohio-class ballistic missile submarine force with an alternative capability designed to carry the Trident II D5 missile; and

(B) a period of 30 days has elapsed after the date on which the report under subparagraph (A) is submitted.

(2) FORM- The report required by paragraph (1) shall be submitted in unclassified form, but may include a classified annex.

The report states:

Ohio-class replacement program

The committee strongly supports a robust sea-based strategic deterrent force. The current 14 ships of the Ohio-class ballistic missile submarines are a national treasure and have helped keep the nation safe for over two decades. Like the ballistic missile submarine classes that preceded them, a percentage of these vessels remain in an alert posture, at sea, invulnerable to attack by potential enemies, ready to retaliate should the nation be attacked. The committee supports efforts to retain this capability into the future.

However, the committee has questions concerning the current program to replace the Ohio-class ships. First, the basic requirement of how much and what type of deterrent capability is sufficient for the national military strategy has not been communicated to the committee. Second, the committee has not been afforded the opportunity to review the analysis of alternatives conducted by the Navy, which determined that a submarine large enough to support the Trident II D5 missile weapons system is the preferred vessel to continue deterrent capability. Third, the committee has concerns that the decision to proceed with a submarine program of similar size as the Ohio-class ships was made prior to the analysis of alternatives, and that a potential use of a modified Virginia-class submarine, in production today, was discounted in favor of maintaining the Trident II D5 weapons system. Because of these concerns, elsewhere in this Act the committee will authorize, but withhold authority to obligate more than 50 percent of the funds requested for development of this program until the Secretary of Defense certifies to the committee of the necessity to continue sea-based deterrence with the Trident II D5 weapons system. (Pages 77-78)

Senate (S. 3454)

The FY2011 defense authorization bill (S. 3454), as reported by the Senate Armed Services Committee (S.Rept. 111-201 of June 4, 2010), recommends approval of the Navy's FY2011 research and development funding request for the SSBN(X) program (page 732, lines 41 and 45 of the printed bill). (The bill as reported recommends three funding additions to PE 0603561N [line 41] totaling $26 million, but these additions do not appear specific to the SSBN(X) program. See pages 62-64 of the committee's report for discussions of these three recommended additions.)

The committee's report states:

> The committee notes that the current shipbuilding plan includes the cost of the SSBN (X) program and the committee encourages the Navy to closely scrutinize requirements for this program in order to minimize its impact on the recapitalization of the Navy's battle force. (Page 40)

The committee's report also states:

> **Strike study**
>
> The budget request included $81.2 million in Research, Development, Test, and Evaluation, Navy, PE 11221N line 162 for strategic submarine and weapons systems support. The committee recommends a decrease of $10.0 million. Of the amount requested $10.0 million was for a study for ambiguity and other issues that associated with conventional and nuclear payloads on strategic ballistic missile submarines. The committee recommends no funds for the study. The committee notes that the National Academy of Sciences conducted an extensive study on this issue and the additional study would be redundant. (Page 71)

Final Version (H.R. 6523/P.L. 111-383)

H.R. 6523/P.L. 111-383 of January 7, 2011, contains no provisions relating specifically to the SSBN(X) program. The joint explanatory statement of the House and Senate Armed Services Committees on H.R. 6523 does not discuss the program.

FY2011 DOD Appropriations Bill (S. 3800)

Senate

The Senate Appropriations Committee, in its report (S.Rept. 111-295 of September 16, 2010) on S. 3800, recommended reducing the Navy's FY2011 research and development funding request for PE (Program Element) 0603561N, Advanced Submarine System Development, by $49.3 million for "execution delays" (page 150, line 41). The report does not discuss how much, if any, of this $49.3 million reduction is to be applied against Project 3220—the part of PE 0603561N that is for the SSBN(X) program. Since Project 3220 accounts for about 81% of the funding requested for PE 0603561N ($493.0 million of $608.6 million), it is possible that at least some of the $49.3 million reduction would be applied against Project 3220. The committee's report also recommends seven funding additions to PE 0603561N totaling $25.5 million (page 150, line 41). The committee's report does not discuss these additions in detail; they may not be specific to the SSBN(X) program.

The committee's report recommends approving the Navy's FY2011 research and development funding request for PE 0603570N, Advanced Nuclear Power Systems, which includes, in Project 3219, $179.3 million for the SSBN(X) program (page 145, line 45).

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